

WHAT IS CLAIMED IS:

1. A two-optical signal generator comprising:

a first light source for generating a single-mode optical signal;

first optical modulation means for modulating the optical signal generated by said first light source according to an inputted signal, and outputting a modulated optical signal including predetermined specific two optical signals having a predetermined optical frequency difference;

a second light source for generating a multi-mode optical signal including predetermined two further optical signals having substantially the same wavelengths as those of the predetermined specific two optical signals of the modulated optical signal, respectively; and

optical injection means for optically injecting the modulated optical signal outputted from said first optical modulation means into said second light source,

wherein the predetermined specific two optical signals of the modulated optical signal are injection-locked into the predetermined two further optical signals of the multi-mode optical signal, so that said second light source generates an injection-locked predetermined specific two optical signals.

2. The two-optical signal generator as claimed in claim 1, further comprising:

second optical modulation means, provided between said first light source and said first optical modulation means, for modulating the optical signal generated by said first light source according to an inputted data signal, and outputting a modulated further optical signal to said first optical modulation means.

3. The two-optical signal generator as claimed in claim 1,

wherein said first light source generates a single-mode optical signal, modulates the generated optical signal according to an inputted data signal, and outputs a modulated further optical signal.

4. A two-optical signal generator comprising:

a first light source for generating a single-mode optical signal;

optical modulation means for modulating the optical signal generated by said first light source according to an inputted signal, and outputting a modulated optical signal including predetermined specific two optical signals having a predetermined optical frequency difference;

a second light source for generating a multi-mode optical signal including predetermined two further optical signals having substantially the same wavelengths as those of the predetermined specific two optical signals of the modulated optical signal, respectively, modulating the generated multi-mode optical signal according to an inputted data signal, and outputting a modulated multi-mode optical signal; and optical injection means for optically injecting the modulated optical signal outputted from said optical modulation means into said second light source, wherein the predetermined two further optical signals of the modulated optical signal optically injected are injection-locked into the predetermined specific two optical signals of the multi-mode optical signal, and wherein the injection locking is turned on or off in accordance with a level of the data signal, thereby switching over whether or not said second light source generates the predetermined specific two optical signals.